Service Manual Tunturi T70 /T80

T70 Console

T80 Console

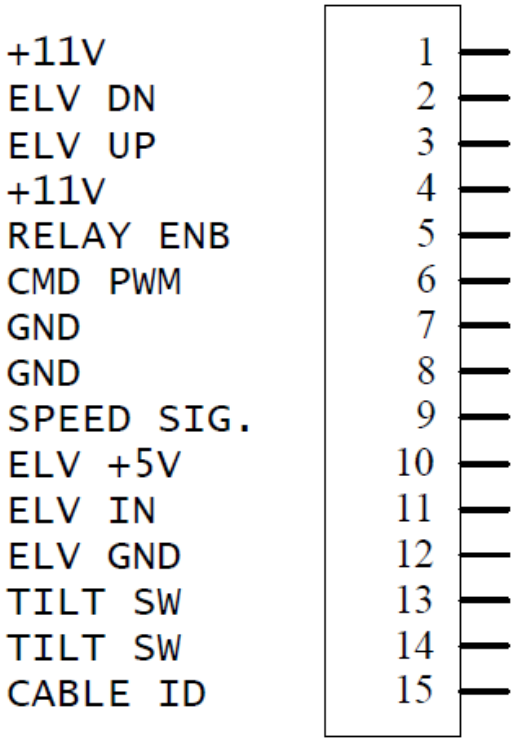
Power board T70 /T80

Operating Mode	**LED's**
Sleep Mode, Treadmill horizontal	Bright: 18V, AC1, READY, VCON Increasing: MTR VOL Bright or Off: SPD
Normal Mode	Bright: 18V, AC1, MTR VOL, READY, RELAY, VCON Flashing: M_PWM, PWM, SPD
Failure Mode	**LED's**
Over current condition (Belt will have force for 5s max)	Bright: 18V, AC1, I LIM, MTR VOL, READY, RELAY, VCON Flashing: M_PWM, PWM Bright or Off: SPD
Shorted Motor	Bright: 18V, AC1, MTR SHRT, MTR VOL, READY, VCON Flashing: PWM Bright or Off: SPD

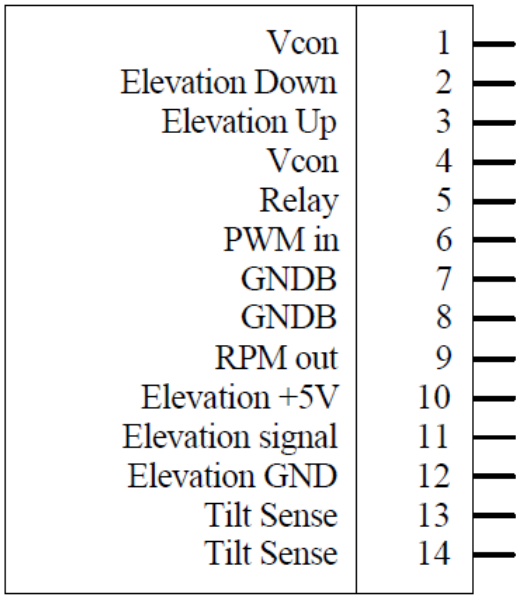
The function of each LED is as follows:

Designator	Name	Description
D33	18V	Turns on when the transformer secondary that is attached to power ground outputs power. This indicates that the low voltage transformer is working and implies that the "hot side" control electronics are active.
D4	AC1	AC power is at the primary to the transformer.
D7	DOWN	Current is flowing in the elevation control circuit to allow for the down relay controlling the elevation motor to activate.
D32	I LIM	Turns on when the current flowing through the motor reaches the circuit set maximum. This indicates that the system is loaded to or beyond its capacity.
D40	M_PWM	Turns on when the power FET is conducting. The LED will seem to become brighter as the PWM at the power FET approaches 100% because it is flashing at a greater rate than the human eye can see.
D29	MTR SHRT	Turns on when excessive current passes through the FET. This LED implies that there is a short in the motor or motor wiring.
D24	MTR VOL	Turns on dimly when power is first applied and becomes brighter as the large capacitor charges. When the LED is bright this indicates that the motor controller is ready to power the motor.
D12	PWM	Turns on when the incoming PWM signal is logical high with a duty cycle of less than 99%. The LED will seem to become brighter as the incoming PWM approaches 99% because it is flashing at a greater rate than the human eye can see.
D21	RELAY	Turns on when the console commands the relay to turn on. This indicates that power is present at the relays to energize them. It implies that the motor controller and the console are communicating.
D30	SPD	Flashes each time the speed sensor is triggered. This indicates that the speed sensor is working and communicating with the motor controller. This also indicates that the signal has been converted to a TTL output. This does not indicate that the console is receiving the speed feedback.
D10	UP	Current is flowing in the elevation control circuit to allow for the up relay controlling the elevation motor to activate.
D34	VCON	Turns on when the voltage regulator on the transformer secondary attached to Chassis Ground that supplies the console outputs power. This indicates that the low voltage transformer is working and implies that there is enough power to turn the console on and that the "cold" side electronics is active.

Console's J2
To Motor Controller I/O



Motor Controller's J3
To Console I/O



Stop Code		Reason	Solution(s)
E1	SPEED STALL	Speed signal is missing on the console board	The speed cable connection on the motor controller's (power board) J6 is loose (the SPD LED beside J6 should be on and flashing when you move the belt with feet).
			The optical speed sensor does not work. Swap with a good sensor to see what happens.
			The cable connecting the power board and the console is loose or broken (please use a scope to check the console and the power board's pin 9 to see if there is a speed signal presenting there or simply first use a good cable to swap it and see if the problem is resolved or not.
E2	OVER SPEED	The measured speed is over the maximum speed in a certain amount.	The cable connecting the power board and the console is broken. (Please check if the cable's wire on pin 6 is exposed to a high voltage wire easily; or simply first use a good cable to swap it and see if the problem is resolved or not.)
E3	SPEED RUNAWAY	The measured speed is over the target speed in a certain amount.	The cable connecting the power board and the console is broken. (Please check if the cable's wire on pin 6 is exposed to a high voltage wire easily; or simply first use a good cable to swap it and see if the problem is resolved or not.)
E16	STUCK KEY	A key is holding constantly for a certain time	A key button is loose or stuck.
E18	EEPROM FAIL	EEPROM self-check fails.	Cycle power. If the code comes up again, replace the board.
Not assigned.	"OFF" is displayed on the Elevation window.	The elevation malfunctions. The console only disables the lift motor related movements so that the user can still running on the belt.	The elevation cable connection on the motor controller's (power board) J4 is loose, or the elevation cable connection on the motor controller's (power board) J7 is loose; or the wires to J7's pins 1 and 3 are swapped.
			The cable connecting the power board and the console is broken. (Please check if the cable's wires on pins 2, 3, 10, 11 and 12 are in proper condition; or simply first use a good cable to swap it and see if the problem is resolved or not.)

Service menu

Make sure the treadmill is in the start-up mode
(you might need to switch the machine off and on to reach this mode)

Enter the service menu by pushing following key sequence:

<SET> (confirmed by an acoustic beep from monitor speaker)
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<SET> (confirmed by an acoustic beep from monitor speaker)
<ENTER-JOGWHEEL> (confirmed by showing message: **Service menu**)
<ENTER-JOGWHEEL> (confirmed by entering the service menu)

The service menu consist of fifteen states.
You can navigate through the service menu by using the enter-jogwheel. You can leave the service menu by pressing the Start/stop button at any state (except at state 9 : keyboard test)

When rotating enter-jogwheel clockwise:

1st state : Minimum PWM
The distance screen will show the stored minimum PWM related to the latest ran speed calibration procedure (see state 12 : speed calibrate) Press set if this value needs to be adjusted and use the speed-up / -down button to adjust this value. Confirm the adjustment by pressing the enter-jogwheel.

2nd state : Half max. PWM
The distance screen will show the stored half maximum PWM related to the latest ran speed calibration procedure (see state 12: Speed calibrate) Press set if this value needs to be adjusted and use the speed-up / -down button to adjust this value. Confirm the adjustment by pressing the enter-jogwheel.

3rd state : Maximum PWM
The distance screen will show the stored maximum PWM related to the latest ran speed calibration procedure (see state 12: Speed calibrate) Press set if this value needs to be adjusted and use the speed-up / -down button to adjust this value. Confirm the adjustment by pressing the enter-jogwheel.

4th state : Elevation minimum
The distance screen will read out the actual potential meter value of the elevation unit. The elevation screen will show the target elevation incline. This should be 0%

5th state : Elevation maximum
The distance screen will read out the actual potential meter value of the elevation unit. The elevation screen will show the target elevation incline. This should be 12 %

6th state : Magnet count (software version ≤ V. 1.00)
The distance screen will show the count of magnets. This count is used by the speed sensor to measure the speed during speed calibration and normal use. The number of magnets must me equal to the count of magnets installed in front roller pulley. This number must be one unless modified otherwise. To change the value press set and use speed-up/ -down button to adjust value. Confirm the adjustment by pressing the enter-jogwheel.

6th state : (software version ≥ V. 0.09)

X
X
x

7th state : 10 rev. distance
The distance screen will show a value. This is the belt's moving distance in mm when turning the front roller 10 revolutions.
By adjusting the value slightly, you can precisely match the speed calculated by the console with the actual speed measured by a speed meter at the Motor Test screen. The value can be adjusted by pressing the set button, and adjust with the speed-up / -down button

8th state : Display test
Press enter-jogwheel to enter this option. If selected you will see all digits light up in a random following order. You can leave this option by pressing the enter-jogwheel.

9th state : Keyboard test
Press enter-jogwheel to enter this option. By pressing a console button you will see the readout of the button function in display screen. Mention, you will leave this option if you press the enter-jogwheel again

10th state : HR test
Press the enter-jogwheel to enter this option. Monitor will test if an external heart rate measurement signal is received. If not it will show in distance screen:
If there is a signal received by the monitor it will be shown in Kcal an elevation screen. It will also monitor the strenght of the signal.
Lowest signal is shown as 14.00 up to strongest signal 47.00
Normal user position should have a signal strengt between 35.00 and 40.00
It also will show if the messured hartrate signal is send by telemetry chest strap or by contact HR (only on T70)

11th state : Motor test
Press the enter-jogwheel to enter this option.

Test elevation motor :
You can test the elevation unit by pressing the elevation-up/ -down button. Treadmill will lower or upper it's runningdeck like demanded.

- Kcal screen will show the measured potential meter readout value of the lift motor unit.
- Elevation screen will readout the related inclination.

Test drive motor :
You can test the drive motor by pressing the speed-up/ -down button.

- time display will show measured speed in miles per hour.
- distance screen will show the PWM of the motor.
- speed screen will show the measured speed in kilometer per hour.

Walking belt should start up at 40 PWM if not standing on it. If it starts at a lower PWM it shows the belt runst extremly smooth.

12th state : speed calibrate
Press enter-jogwheel to start speed calibration.
Display will show, **start auto calibration press start.** If you press the start/stop button. The speed calibration will run automatically in following order.

1 **Min. PWM** : Kcal screen will show PWM
2 **Half max PWM** : Kcal screen will show PWM
3 **Max. PWM** : Kcal screen will show PWM
4 **DC test** : the motor will be tested at full power for a short time.

During the speed calibration procedure

- time screen will show the measured speed in miles per hour
- distance screen will show the target speed
- show the measured speed in km per hour

5 cal passed : This message will be shown if the speed calibration procedure is successfully passed.
Press enter-jogwheel once to return to service menu.

13th state : elv. Calibrate
Press enter-jogwheel to start calibration procedure. During calibibration the Text screen will show: **seeking maximum / minimum elevation**
Treadmill will first go to maximum and will lower to minimum afterwards.

- Kcal screen will show potential meter value
- Elevation screen will show inclination of treadmill
- Distance will show maximum potential meter value
- Speed will show minimum potential meter value

After reaching the minimum inclination the treadmill will automaticly run to the 0% setting.

14th state : err. message : The distance screen will show wether the error message function is selected in on or off mode. You can change this valeu by pressing the speed down or speed up button. Press enter-jogwheel to confirm and store the change.

- Off mode : Treadmill display will show error numbers (example *Error 1*)
- On mode : Treadmill display will show error text message (example *speed stall)*

15th state : error list : press enter-jogwheel to see the logfile stored in monitor eprom.

- Kcal screen will show Err 1 up to 5 (make selection by pressing incline up or down.
- Time screen will show error text message
- Distance screen will show error code number

It is unable to clear the logfile.

NB! Always when servicing the treadmill be sure that the power has been switch off and the main cable is plugged off the from wall outlet. Big capacitors on the control board might retain high voltage level even for several hours after the unit has been plugged off from the power outlet.

Error texts

Error Code			Solution(s)
Error code in *Off setting	Error code in *ON setting	*See 14th state of service menu	
E1	SPEED STALL	Speed signal is missing on the console board	The speed cable connection on the motor controller's (power board) J6 is loose (the SPD LED beside J6 should be on and flashing when you move the belt with feet).
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